



# National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

*Log H-54B*

Date: January 31, 1990

In reply refer to: H-90-1

Mr. Thomas J. Donohue  
President  
American Trucking Associations, Inc.  
2200 Mill Road  
Alexandria, VA 22314-4677

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From 1985 through 1987, the National Transportation Safety Board conducted a safety study on heavy trucks. During the study, the Safety Board investigated 189 accidents occurring in 29 States; 41 of these accidents involved combination tractors with multiple trailers.<sup>1</sup> Although all parts of the Nation were part of the study, the North Carolina Highway Patrol routinely reported multiple-trailer accidents to the Safety Board's Atlanta Regional Office. Of the 41 accidents involving tractors with multiple trailers, 12 occurred in North Carolina. In all 12 accidents, the truckdrivers had made the transition from driving single trailer units with little or no training. Summaries of several of these cases follow.

On October 20, 1985, the driver of a twin trailer combination unit lost control when he steered sharply left to pass an automobile on an interstate highway near Hendersonville, North Carolina. Both trailers began oscillating laterally, the first trailer struck the automobile, and the rear trailer broke away and overturned. No injuries resulted. The driver had driven semitrailer units for 5 years and twin trailer units for 2 years, but he had received no formal training in the operation of twin trailers.

On February 4, 1986, the driver of a twin trailer combination unit was negotiating a right curve on a descending mountain grade near Clyde, North Carolina, when he felt the rear trailer begin a violent counterclockwise rotation. The rear trailer broke away, overturned onto its left side, slid through a guardrail and down a mountain slope before it came to rest. No injuries resulted. The truckdriver had driven semitrailer units for about 12 years and twin trailer units for about 3 years. His training consisted of 4 hours instruction on the inspection, coupling, and uncoupling of doubles but no training behind the wheel.

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<sup>1</sup> Safety Study--"Case Summaries of 189 Heavy Truck Accident Investigations" NTSB/SS-88/06.

On May 17, 1986, the driver of a twin trailer combination unit ran off the right side of an interstate highway near Asheville, North Carolina, and struck a concrete drainage cover at the outer edge of the shoulder. When he steered left to return the unit to the roadway, the rear trailer broke away and overturned. No injuries resulted. The truckdriver had been driving combination units for about 27 years but multiple trailer units for only 3 years. He had received orientation training in the hookup and inspection of doubles but no training behind the wheel.

On August 30, 1986, a driver of a twin trailer unit on a two-lane highway near Terrell, North Carolina, made a sharp right steering maneuver onto the grassed shoulder to avoid an oncoming automobile. When the driver steered back to the roadway, the rear trailer began weaving laterally; it broke away from its pintle coupling and overturned. No injuries resulted. The driver had about 15 years experience driving heavy vehicles but only 3 days of driving in double combination units. His only training in doubles was a 30-minute orientation provided by the motor carrier.

On September 3, 1986, the driver of a twin trailer combination unit was negotiating a sharp left curve on a steep mountain grade of prohibited roadway; near Hot Springs, North Carolina, when the rear trailer veered right, broke away, and overturned. No injuries resulted. The driver had been hired by the motor carrier 3 weeks earlier with no previous experience as sole driver in twin trailer units. A week before the accident he had driven a similar vehicle with a senior driver on one trip.

In another accident, near Clyde, North Carolina, on May 22, 1987, the driver of a twin trailer unit was negotiating a right curve on a descending mountain grade when the rear trailer began weaving in the roadway. The weaving became rapid oscillation; the trailer broke away from its pintle coupling and overturned on the roadway. No injuries resulted. The driver was a veteran in tractor-semitrailer units but had only 3 years experience with twin trailer units. He had received instruction on the inspection and hookup of doubles but no training behind the wheel.

The accidents cited in this letter indicate that motor carriers generally assumed that a driver of a semitrailer combination unit could easily make the transition to a multiple trailer unit with little or no special training. In most instances, the training received by these drivers addressed only the mechanics of coupling sections of the unit together. Only in one case did the driver receive behind-the-wheel training.

A study conducted by the University of North Carolina in 1984 supports these findings.<sup>2</sup> The report summarized interviews of truckdrivers on the subject of training by stating:

On the whole, drivers reported that their training had been skimpy at best, with a single exception of one driver who had been given extensive training in the operation of twins. Adequate driver training and adequate driver certification with "teeth" in it were mentioned by the drivers as prime needs.

The Surface Transportation Assistance Act of 1982 mandated that such vehicles be permitted on interstate highways and on other specified routes.<sup>3</sup> As a result of the enactment, operation of multiple trailers increased substantially across the Nation. For example, between 1984 and 1986, over-the-road mileage increased nearly 43 percent for double trailer units operated by Consolidated Freightways, one of the Nation's largest motor carriers, and nearly 38 percent for the carrier's triple trailer units.<sup>4</sup> Operation of its single semitrailer units decreased over 55 percent during the period. In 1986, multiple trailer units accounted for nearly 88 percent of the total mileage operated by Consolidated Freightways.

It seems likely that the increased operation of multiple trailers by this large carrier has been experienced by other carriers. A recent study by the Transportation Research Board projects that "by 1990, twins will account for about 11 percent of nationwide combination-truck miles, up from about 4 percent in 1982. Nearly 90 percent of this increase will occur outside the Western States...."<sup>5</sup>

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2 "Potential Safety Aspects of the Use of Larger Trucks on North Carolina Highways." University of North Carolina Highway Safety Research Center, Chapel Hill, North Carolina, December 1984, page ii.

3 The Surface Transportation Assistance Act of 1982, Public Law 97-424, 96 Stat. 2097 (1983).

4 Consolidated Freightways, Inc., Lawrenceville, GA, November 18, 1986.

5 "Twin Trailer Trucks," Transportation Research Board, Special Report 221, Washington, D.C., 1986.

Drivers must be made aware through training, both on the road and in the classroom, of the variables that influence the controllability and maneuverability of the multiple trailer configuration and how these variables compare to and contrast with those that affect operation of the semitrailer combination. For example, relatively small tractor steering movements or braking applications, particularly in a lane change, are magnified by a second trailer and can reach uncontrollable levels, producing considerable yawing and subsequent rollover.

Likewise, there are other truck configurations or types of shipments that also require special driver training for safe transport because of their effects on a vehicle's handling characteristics. Perhaps the most common are bulk liquids. Sudden steering movements or braking applications can cause product surge in a tank vehicle and shifting of the vehicle's center of gravity. Three examples of these type accidents are cited below.

On August 31, 1986, the driver of a cargo tank semitrailer combination unit was negotiating a right curve onto an interstate entrance ramp near Silverthorne, Colorado, when the unit veered left and overturned onto its left side. No injuries resulted. The truckdriver began driving heavy trucks about a year before the accident: a truck for 10 months then the combination tank trailer unit the last 2 months. He had no training or experience to make him aware of the special driving characteristics of a combination unit loaded with liquids.

On September 20, 1986, the driver of a twin cargo tank trailer combination unit was negotiating a left curve on a descending mountain grade near Clyde, North Carolina, when the rear trailer began oscillating laterally. As the unit continued through the curve, the rear trailer broke away and overturned. No injuries resulted. The driver had about 10 years experience driving combination units but only 2 weeks driving doubles. He had received 1 hour of instruction on hookup and inspection of doubles but no behind-the-wheel training. Neither had he received training to alert him of the driving requirements when transporting surging liquid loads.

On May 19, 1987, the driver of a cargo tank semitrailer unit, loaded with gasoline, made a sudden left steering maneuver to pass a slowing automobile near Kinston, North Carolina. The right front of the truck struck the left rear of the car, the truckdriver lost vehicle control, the unit overturned, and fire erupted. The combination unit was destroyed and the truckdriver died in the fire. The driver had 9 years experience driving combination units but only 10 months transporting liquids in tank trailers. He had received no formal truckdriver training. Except for driving 1 week with a senior driver, he had no training or experience to alert him of the different handling characteristics of combination units with static loads from those with surging liquids.

The State of California, recognizing the danger of cargo surge and the driver skill needed to avoid it, made special provision for bulk liquid transport in its driver certification program begun in 1985. Before a driver in California is permitted to transport bulk liquids in combination trucks, he or she must earn a separate certificate similar to the one for hazardous materials drivers.

In its 1986 safety study, "Training, Licensing and Qualification Standards for Drivers of Heavy Trucks" (NTSB/SS-86/02), the Safety Board expressed the belief that truckdrivers should be subject to a training requirement. Further, that training needs to be differentiated to accommodate the widely differing handling characteristics of different types of vehicles. This need exists for drivers of straight trucks who begin to drive articulated vehicles (singles or doubles), drivers of singles who begin to drive multiples, or drivers who begin to haul liquids or other shifting loads. The Safety Board's 1986 study on driver training and licensing reviewed the current state of driver training programs and requirements and concluded that there was a widespread need for training of this type. Currently, however, it appears that most truckdriver training courses are oriented toward teaching basic skills to new drivers.

The 1986 study recommended that the Department of Transportation develop a classified license system, and that it include formal training as a prerequisite for licensing (H-86-8 and -9). These recommendations presumed that additional training would be required for each of the license classifications. Although the commercial driver licensing system, including a classified license system, is now being implemented, it does not require formal training either initially or for drivers who seek to obtain a higher license classification.

Adequate training programs for drivers of varying types of vehicles are essential. The Commercial Motor Vehicle Safety Act of 1986 established minimum Federal standards designed to ensure that each person operating a commercial vehicle is qualified to operate that vehicle.<sup>6</sup> The act partially meets the need for adequate training. But training programs to prepare a driver for the transition from driving trucks or semitrailer combinations to vehicles requiring more skill, such as multiple trailer configurations and liquid cargo units, are still needed. That need must be met by the trucking community to promote safety among the carriers using multiple trailer combinations and other specialized truck vehicles.

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<sup>6</sup> Commercial Motor Vehicle Safety Act of 1986, Public Law No. 99-570, 100 Stat. 3207-170.

The Safety Board understands that the Professional Truck Driver Institute of America (PTDIA) has developed standards for the training of drivers and is now certifying schools that comply with those standards. Likewise, the Safety Board understands that the Commission on Accredited Truck Driving Schools is developing guidelines for trainers. The Safety Board believes that these standards, when completed, should be widely distributed throughout the trucking and truckdriver training industries. Further, trucking companies should be urged to employ only those drivers who have received specialized training consistent with the PTDIA standards for the type of vehicle that they are required to operate.

As a result of its investigations of accidents involving combination units with multiple trailers and other trucks with special handling characteristics, the National Transportation Safety Board recommends that the American Trucking Associations:

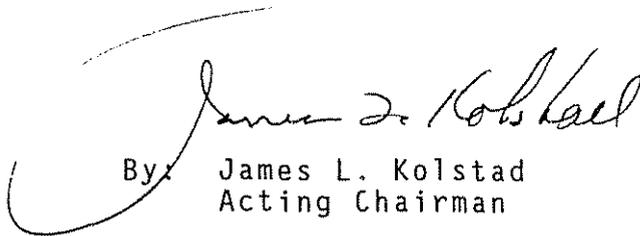
Encourage your members to make certain that their drivers of specialized vehicles (such as articulated vehicles, particularly multiple trailer units, and those with bulk liquids or other shifting loads) receive behind-the-wheel and classroom instruction on the differences in the handling characteristics of those vehicles. Encourage your members to require all operators of specialized equipment to successfully complete such training before they are permitted to drive.  
(Class II, Priority Action) (H-90-1)

As a result of its investigations, the Safety Board also issued Safety Recommendations to the following organizations:

Commission on Accredited Truck Driving Schools (H-90-2);  
Federal Highway Administration (H-90-3 and -4);  
International Brotherhood of Teamsters (H-90-5);  
National Private Truck Council (H-90-6); and  
Professional Truck Driver Institute of America (H-90-7).

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation H-90-1.

KOLSTAD, Acting Chairman, BURNETT, LAUBER, and DICKINSON,  
Members, concurred in this recommendation.



By: James L. Kolstad  
Acting Chairman